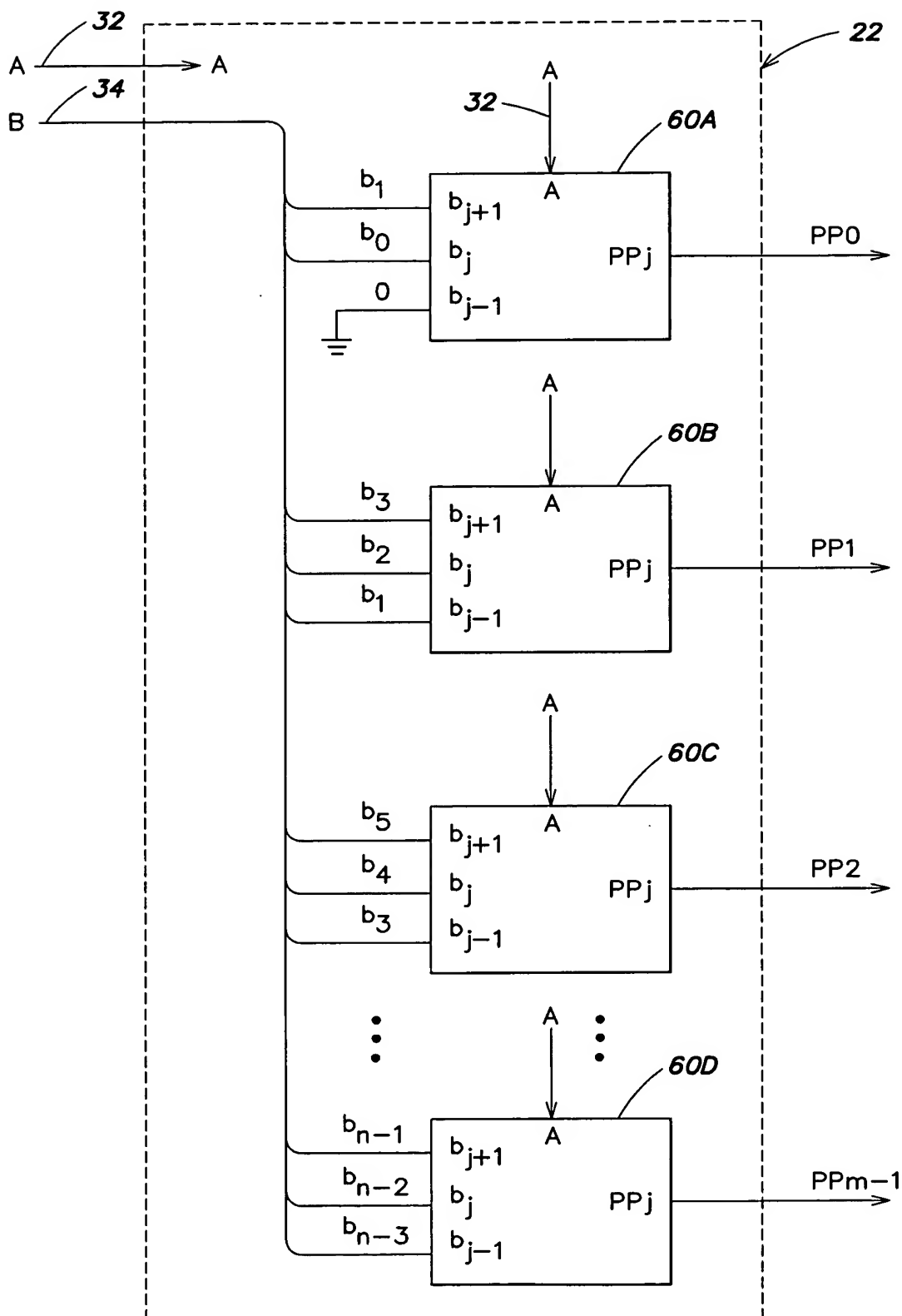
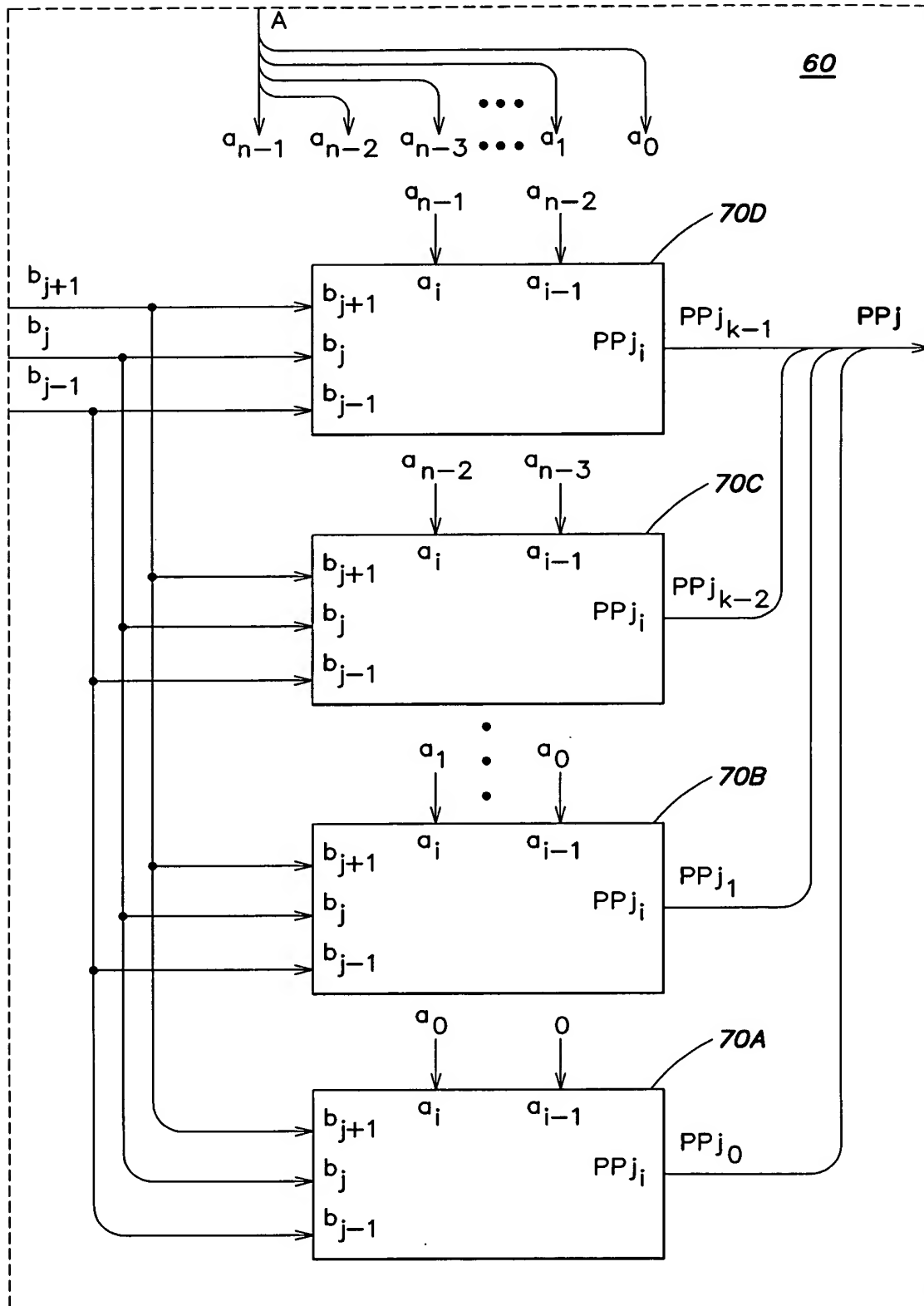


**FIG. 1**  
(Prior Art)



**FIG. 2**  
(Prior Art)



**FIG. 3**  
(Prior Art)

$$PP_j = (a_i X_1 + a_{i-1} X_2) \oplus N \quad \text{eq. (1)}$$

where

$$X_1 = b_j \oplus b_{j-1} \quad \text{eq. (2)}$$

$$X_2 = \overline{b_{j+1}} b_j b_{j-1} + b_{j+1} \overline{b_j} \overline{b_{j-1}} \quad \text{eq. (3)}$$

$$N = b_{j+1} \quad \text{eq. (4)}$$

**FIG. 4A**

(Prior Art)

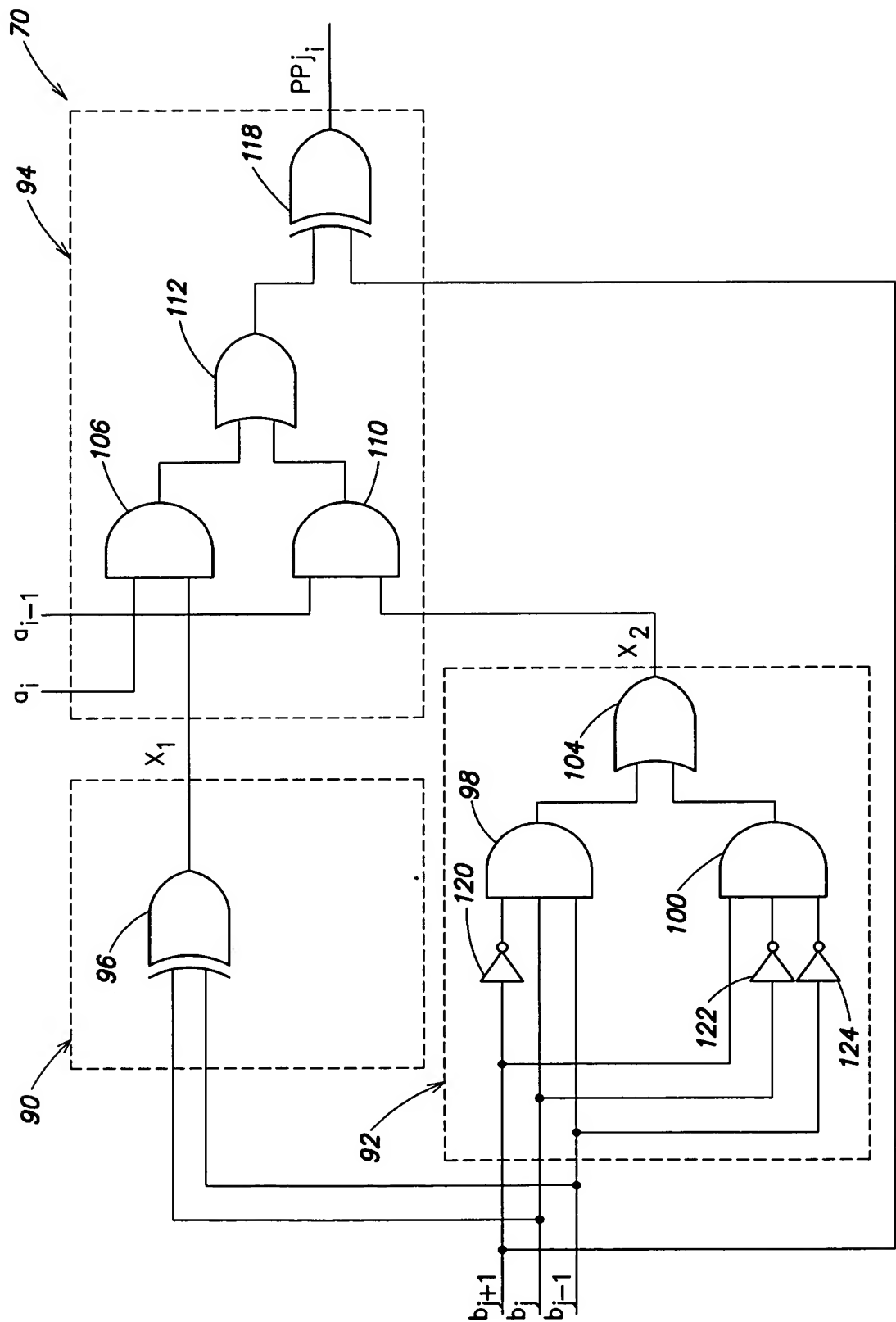
$b_{j+1}$	$b_j$	$b_{j-1}$	$X_1$	$X_2$	$N$	$PP_j$	$PP_j$
0	0	0	0	0	0	0	0
0	0	1	1	0	0	$a_i$	A
0	1	0	1	0	0	$a_i$	A
0	1	1	0	1	0	$a_{i-1}$	2A
1	0	0	0	1	1	$\overline{a_{i-1}}$	-2A
1	0	1	1	0	1	$\overline{a_i}$	-A
1	1	0	1	0	1	$\overline{a_i}$	-A
1	1	1	0	0	1	0 * see note (1)	0 * see note (1)

Note (1)

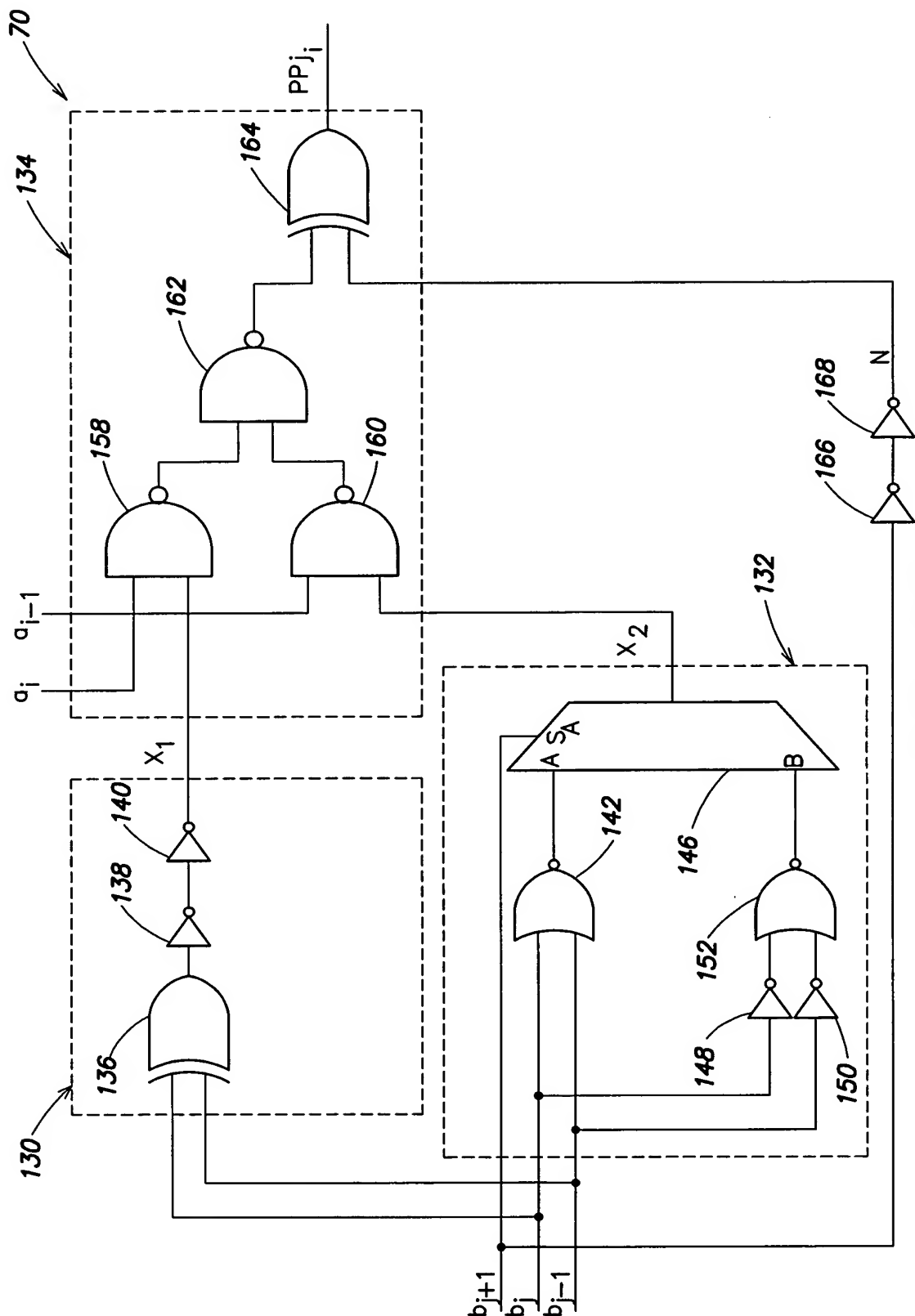
In practice for the case of  $b_{j+1} b_j b_{j-1} = 1, 1, 1$ , the partial product bit  $PP_j$  is frequently set equal to 1 in accordance with eq. (1) and therefore, the partial product  $PP_j$  is equal to 1,...,1. However, the net effect of the partial product bit  $PP_j$  and the partial product  $PP_j$  to the adder 24 is 0 because a sign bit of 1 is added to the LSB of the partial product  $PP_j$  during compressing in the adder.

**FIG. 4B**

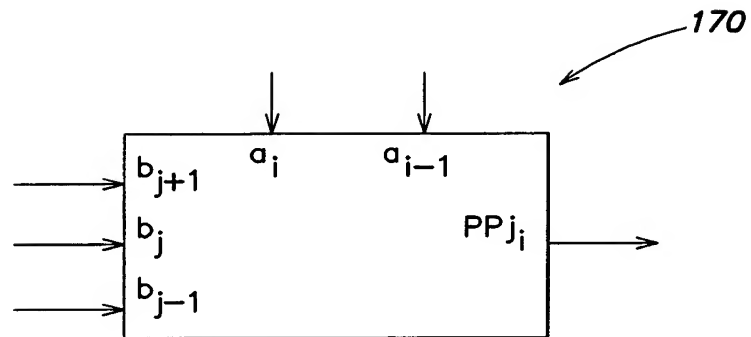
(Prior Art)



**FIG. 5A**  
(Prior Art)



**FIG. 5B**  
(Prior Art)



**FIG. 6**

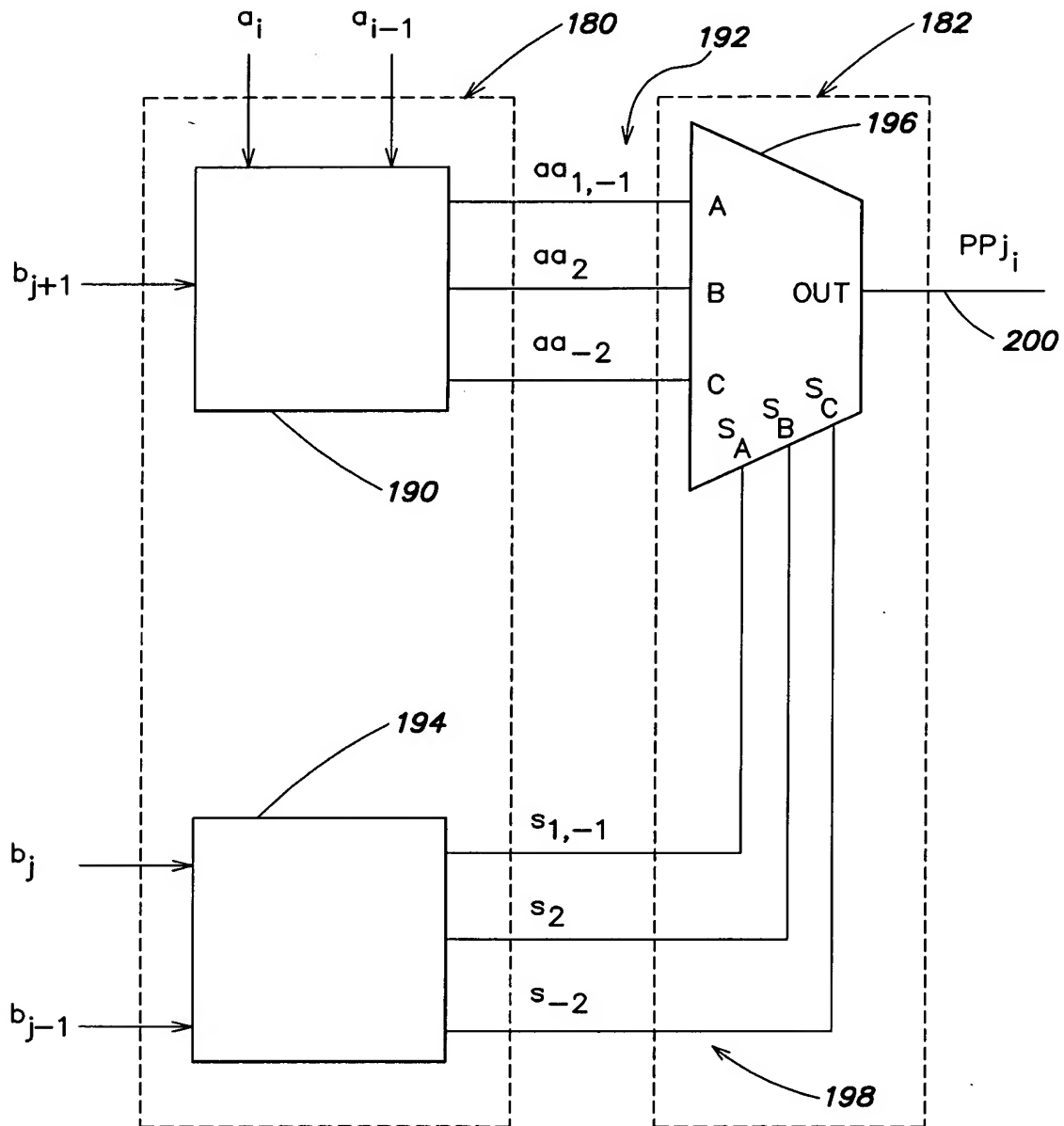
$$\begin{aligned}
 PPj_i &= s_{1,-1} aa_{1,-1} + s_2 aa_2 + s_{-2} aa_{-2} & \text{eqn. (5)} \\
 \text{where} & & \\
 s_{1,-1} &= b_j \oplus b_{j-1} & \text{eqn. (6)} \\
 s_2 &= b_j b_{j-1} & \text{eqn. (7)} \\
 s_{-2} &= \overline{b_j} \overline{b_{j-1}} & \text{eqn. (8)} \\
 aa_{1,-1} &= a_i \oplus b_{j+1} & \text{eqn. (9)} \\
 aa_2 &= a_{i-1} \overline{b_{j+1}} & \text{eqn. (10)} \\
 aa_{-2} &= \overline{a_{i-1}} b_{j+1} & \text{eqn. (11)}
 \end{aligned}$$

FIG. 7A

$b_{j+1}$	$b_j$	$b_{j-1}$	$s_{1,-1}$	$s_2$	$s_{-2}$	$aa_{1,-1}$	$aa_2$	$aa_{-2}$	$PPj_i$	$PPj$
0	0	0	0	0	1	$a_i$	$a_{i-1}$	0	0	0
0	0	1	1	0	0	$a_i$	$a_{i-1}$	0	$a_i$	A
0	1	0	1	0	0	$a_i$	$a_{i-1}$	0	$a_i$	A
0	1	1	0	1	0	$a_i$	$a_{i-1}$	0	$a_{i-1}$	2A
1	0	0	0	0	1	$\overline{a_i}$	0	$\overline{a_{i-1}}$	$\overline{a_{i-1}}$	-2A
1	0	1	1	0	0	$\overline{a_i}$	0	$\overline{a_{i-1}}$	$\overline{a_i}$	-A
1	1	0	1	0	0	$\overline{a_i}$	0	$\overline{a_{i-1}}$	$\overline{a_i}$	-A
1	1	1	0	1	0	$\overline{a_i}$	0	$\overline{a_{i-1}}$	0	0

FIG. 7B





**FIG. 8**

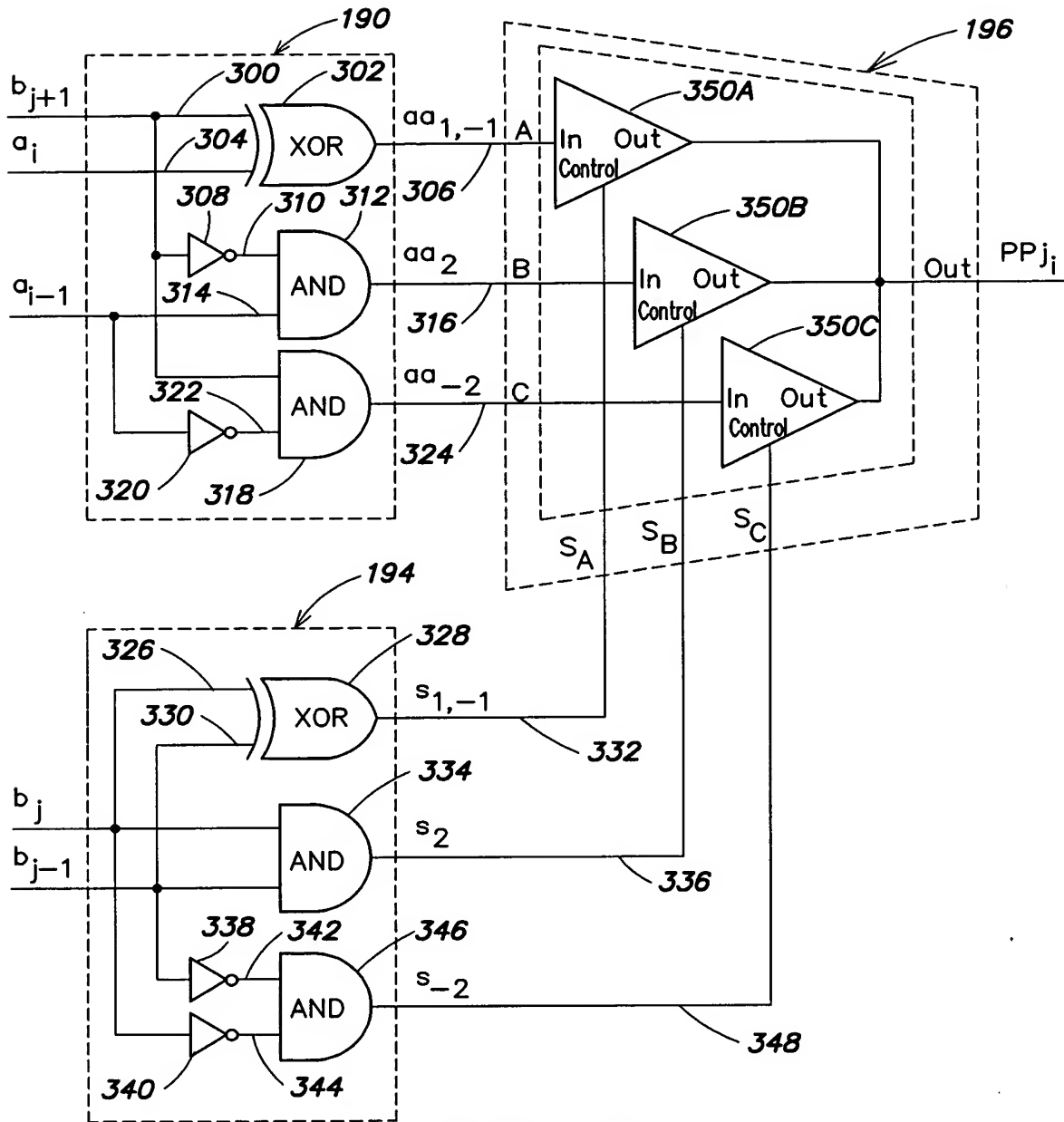


FIG. 9

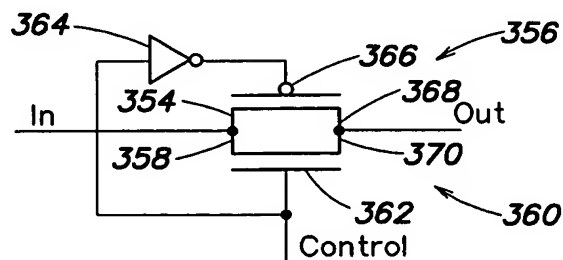
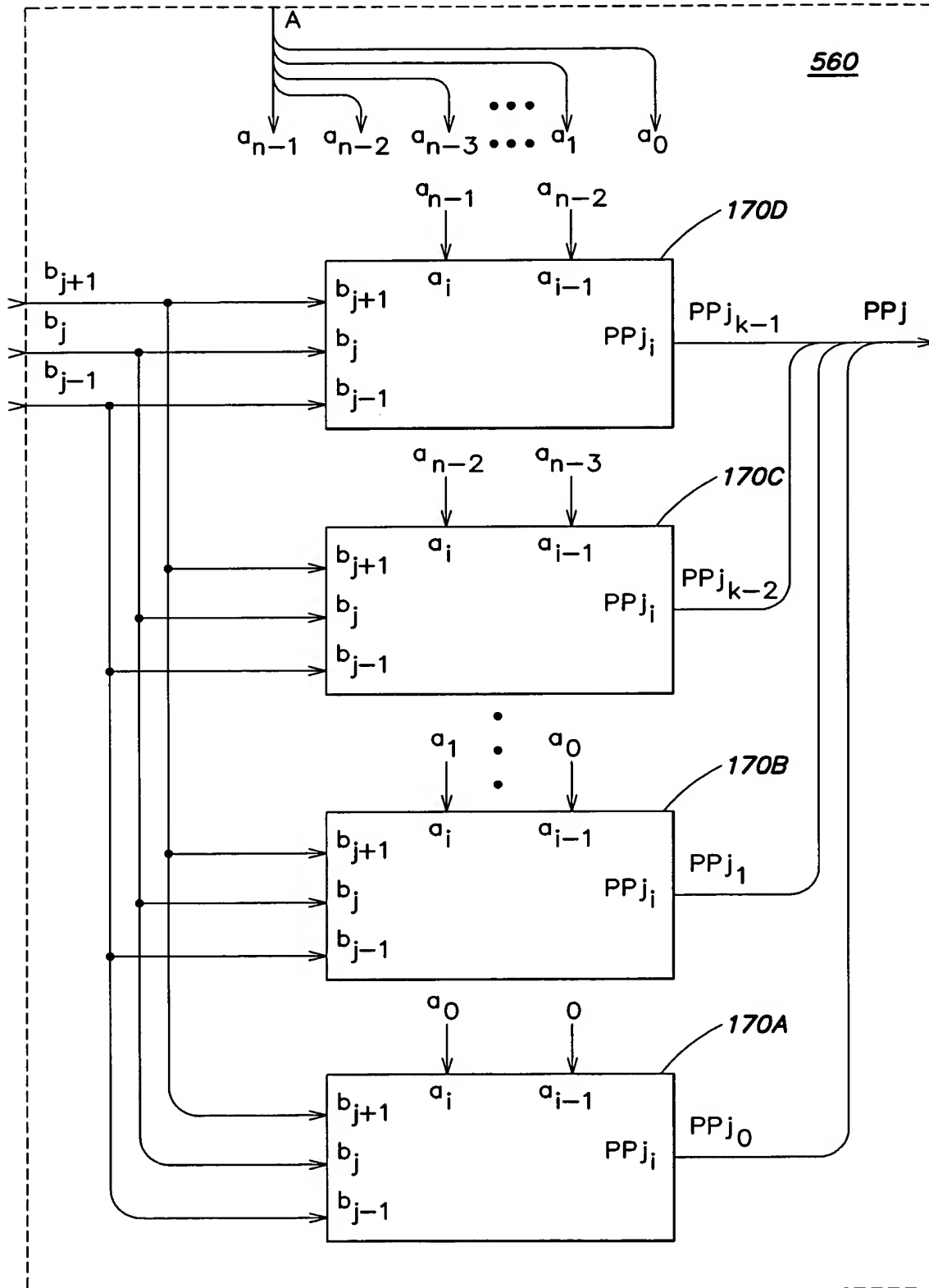


FIG. 10



**FIG. 11**

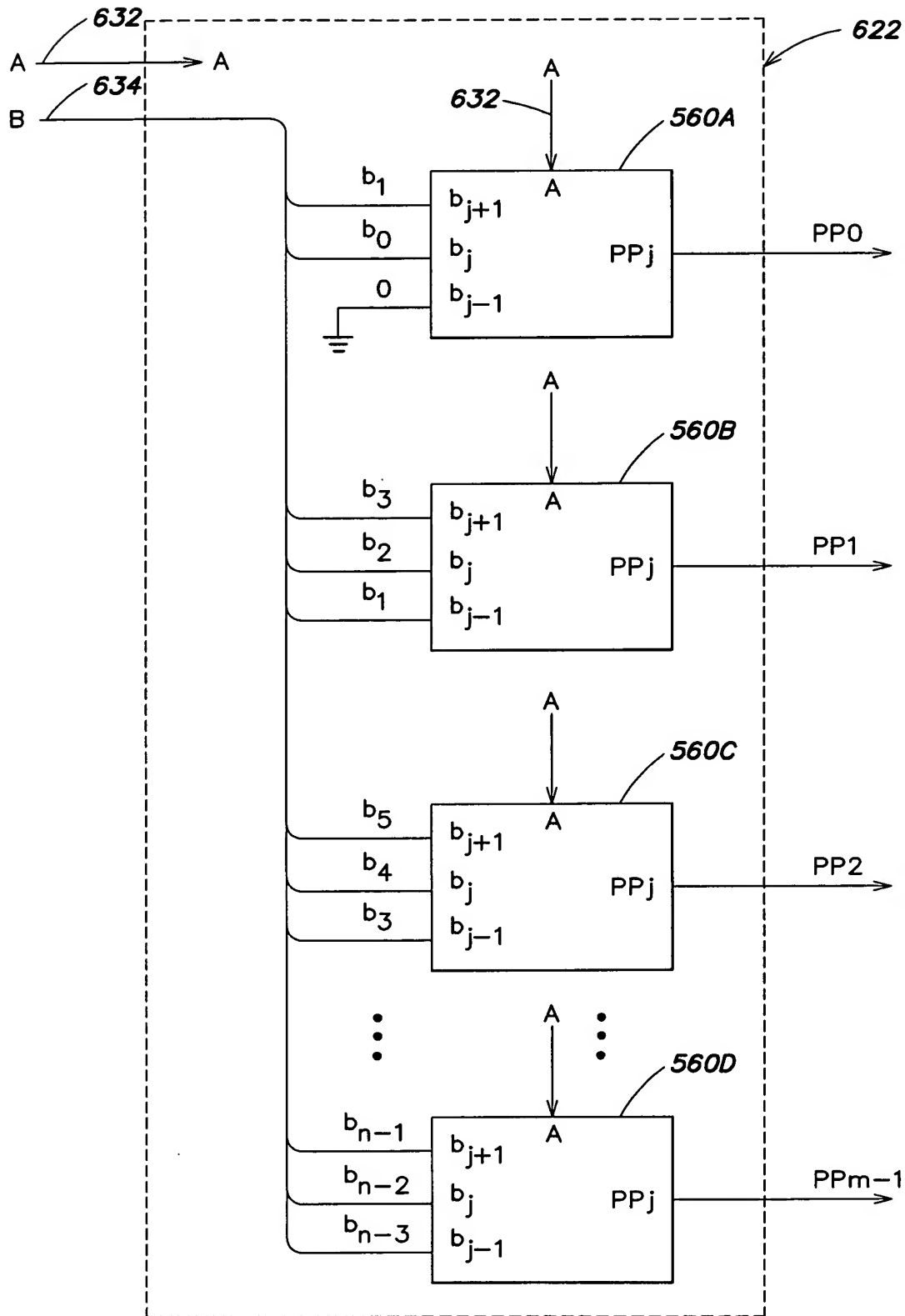
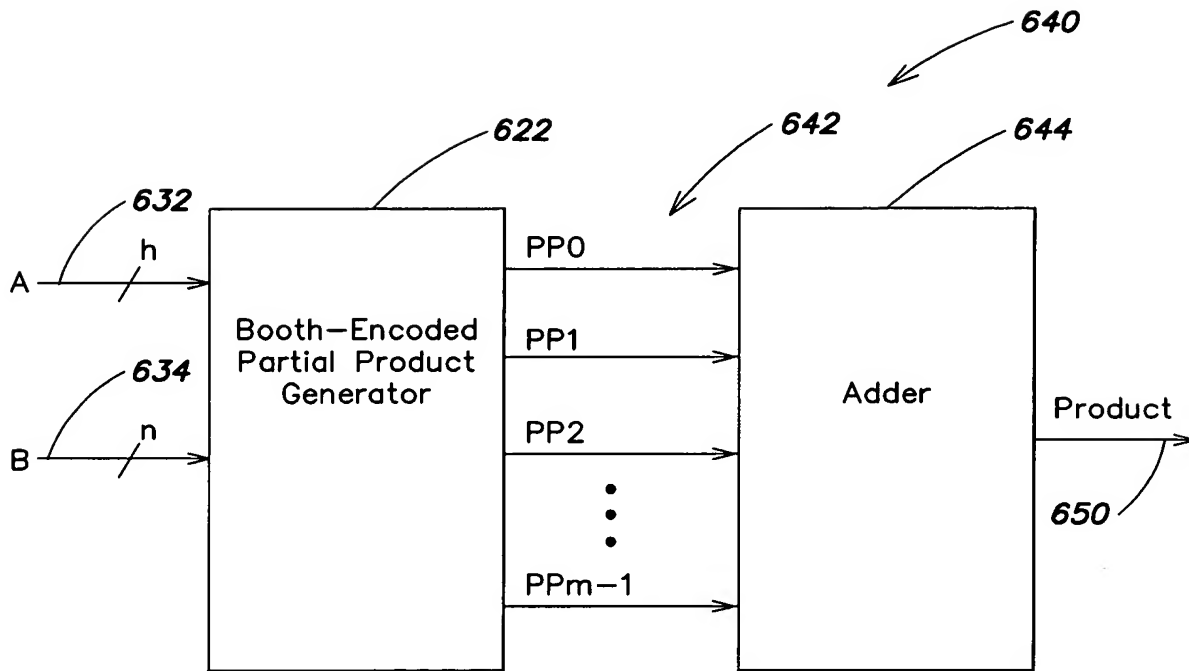


FIG. 12



**FIG. 13**